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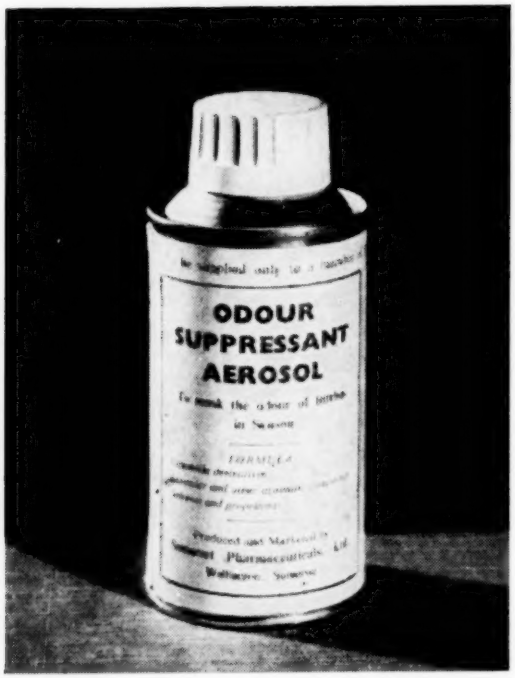

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Dr. Jenner and the Distemper in Dogs

BY

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EDWARD Jenner, M.D., LL.D., F.R.S., Physician Extraordinary to the King (1794-1823), will always be remembered for the introduction of vaccination. The more one reads of his life and work the more one appreciates his wide interests.

He was a founder member of the Medical and Chirurgical Society in 1805. His fellow members included Edward Coleman, Veterinary Surgeon General of the Veterinary College, St. Pancras, Astley Cooper, F.R.S., Surgeon to Guy's Hospital, New Bond Street, Humphrey Davy, secretary of the Royal Society and Professor of Chemistry of the Royal Institution, and John Hunter.

On March 21st, 1809, Jenner read a paper before the society entitled "Observations on the Distemper in Dogs." This paper was based on his experience with the Earl of Berkeley's foxhounds. Although the disease had been known on the continent of Europe for a long time, it was apparently unknown in Gloucestershire and the neighbouring counties until the middle of the eighteenth century. By the beginning of the nineteenth century it had spread throughout the country. Jenner recognised that it was a contagious disease, with an incubation period of about 10 days. It was usually an acute condition with mortality of at least 1 in 3. He described respiratory, digestive and eye symptoms. He realised that the nervous system was affected as early as the second day, and described changes in disposition, epileptic fits and chorea. Usually one attack of distemper produced a lifelong immunity.

Jenner had attempted, without success, to destroy the infection in kennels by disinfection with hydrochloric acid gas. He mentioned cases showing jaundice and hepatitis, which to-day suggests *Leptospira icterohaemorrhagiae* infection, rather than the canine distemper complex.

Jenner recognised that distemper in the dog was not communicable to man. He attempted to differentiate between distemper and rabies in the dog. "Having never, to a certainty, seen a dog with hydrophobia, I am of course unable to lay down a positive criterion for distinguishing between that disease and the distemper, in the precise way I could wish; but if the facts have been correctly stated, that in hydrophobia, the eye has more than ordinary vivacity in it, and as the term implies, he refuses to take water, and shudders even at the sight of it, while in the distemper he looks dull and stupid, is always seeking after water, and never satisfied with what he drinks, there can be no loss for a ready discriminating line between the two diseases."

It is interesting to find that Jenner does not quote any of the contemporary accounts of either disease.

Blaine and Youatt subsequently criticised Jenner's description of distemper as "made up of distemper and rabies, and unlike both." They completely ignored the purpose behind his paper which was to describe the disease to the medical profession so that it could be distinguished from rabies. The distempered dog could be confused with the rabid dog, to be bitten by the former was not a great risk, whereas a bite from the latter was serious. Jenner quoted Hunter's case of the man who believed that he was afflicted with hydrophobia as the result of a dog bite. It subsequently turned out that the dog was not rabid and the man rapidly recovered.

Jenner carried out experiments on dogs, inoculating them with cowpox in an attempt to prevent distemper. Although at first believed to be successful these experiments ended in failure.

In 1822 Jenner suggested that staggers in the horse might be similar to distemper in the dog. At the same he recorded that he had seen a rabid dog and conducted a *post-mortem* examination upon it; he remarked on the similarity to the *post-mortem* appearance in distemper. He also mentions that he had not seen a case of hydrophobia in man.

Jenner's great contribution to medicine was vaccination, but he made many other contributions to knowledge, of which his observations on distemper are one example.

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Tuberculosis in Attested Herds Caused by the Human Type Tubercle Bacillus

BY

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SUMMARY.—Tuberculosis in cattle in 5 attested herds caused by the human type tubercle bacillus is described.

In all 5 herds the human type infection, as indicated by tuberculin tests as well as by post-mortem *findings, was mainly in the young stock. At necropsy there were either no macroscopic lesions or small lesions only in the respiratory or alimentary systems.*

In all of the herds a history of an infected person working in contact with the cattle was confirmed. No further reactors occurred in any of these herds after the removal of the known human source of infection.

Drug sensitivity patterns were of value for the comparison and possible identification of the strains of human type tubercle bacilli isolated from a calf and from the infected human contact in the one case tested.

Typing of all strains was carried out by cultural and biological tests. It was found that the growth and morphology of colonies of human type tubercle bacilli on primary culture from bovine tissues sometimes showed some of the characteristics of the bovine type. The virulence of these human strains was found to be the same as for typical human strains.

THE human type tubercle bacillus is not important as a cause of progressive tuberculosis in cattle. Nevertheless, cattle may become infected with tubercle bacilli of this type, and although they develop no sign of active disease, they may give positive tuberculin reactions. A number of cases have been recorded in which human type tubercle bacilli have been isolated from the tissues of cattle which have been sensitised to the tuberculin test, either without the production of macroscopic lesions or with small lesions in the respiratory or alimentary systems.

In the literature from Great Britain there is little evidence of the presence of infection in cattle with tubercle bacilli of the human type, and only 2 previous cases of naturally acquired infection have been reported. Griffith (1936) described human type tuberculosis of the right lung and a mediastinal lymph node of a calf which had reacted to the tuberculin test. This calf had had contact with a phthisical person. Reid (1939) reported the recovery of human type tubercle bacilli from a suspension of the parotid, retropharyngeal and submaxillary lymph nodes of a reactor heifer in which no macroscopic lesions of tuberculosis were detected.

Another case of tuberculosis in a calf from which tubercle bacilli of the human type were obtained was reported by Griffith (1913). This calf had been reared on milk from experimental cows which, as young calves, had been protectively vaccinated by intravenous inoculation with living human tubercle bacilli. When a few months old the calf was tested with tuberculin and reacted. It was slaughtered and at autopsy tuberculosis was found in one mesenteric lymph node. There is little doubt that the source of the human bacilli in this case was cows' milk, for it was shown subsequently that a heifer in the herd, which had been vaccinated when 4 days old, was excreting human bacilli in her milk. This is the only recorded cases of tuberculosis caused by the human type bacillus being transmitted from one bovine animal to another.

Since the declaration in 1952 of the first tuberculosis eradication areas under the Attested Herds Scheme in this country, *post-mortem* examinations of positive reactor cattle have been carried out wherever practicable. Material from 1,990 of these tuberculin reactors has been submitted to this laboratory for examination. These samples were sent when no macroscopic lesions of tuberculosis were found on *post-mortem* examination and when confirmation of the existence of tuberculosis or typing of the infection was required. During this period, *Mycobacterium tuberculosis*, human type, has been isolated from 12 reactor cattle in 5 attested herds in England and Wales. Reference to these cases has been made in Report (1954), Report (1955) and Report (1957), and further details are presented here.

Case No. 1

History and Post-mortem *Findings*

The herd comprising 119 cattle had been attested for 8 years, was self-contained and had never had any tuberculin reactors until a 3-month-old heifer calf reacted at an annual herd test, giving no response to avian tuberculin and an increase in skin measurement to mammalian tuberculin of 17 mm. with diffuse oedema. No other reactors were found either at this annual test or at the 60 days herd test. The calf was homebred and its dam had shown no tuberculin reaction nor abnormality of the udder. Biological examination of a herd bulk milk sample was negative for tubercle bacilli. The calf was removed from the herd but kept in isolation on other premises for retesting before slaughter. After 2 months there was no reaction to avian tuberculin and an increase to mammalian tuberculin of only 4 mm. with slight oedema. Three months later the calf was retested again in isolation and the reactions to avian and mammalian tuberculins respectively were 3 mm. and 6 mm., both with slight oedema.

The animal was slaughtered for examination. A calcified nodule, approximately 4 mm. in diameter, and surrounded by several caseous and calcifying lesions up to 2 mm. diameter, was found in the right

bronchial lymph node. No other lesions were found.

Two farm workers who had had contact with the cattle on this farm were subsequently treated for pulmonary tuberculosis. One had worked with the cattle during the previous year but had been transferred later to general duties unconnected with cattle and was last at work 5 months prior to the reactor calf being found. He was still intermittently sputum-positive and a sputum sample was sent to this laboratory for examination and typing tests. The work of the other included the delivery of hay and cake to the animals. This man was last at work 15 days after the reactor calf was detected and he was sputum-positive at that time. With hospital treatment the sputum of this patient had become consistently negative and by the time *post-mortem* examination had been carried out on the calf, no culture was available for comparative tests with the organism isolated from the calf. The tubercle bacilli recovered from both these patients were classified in the hospital laboratory by cultural tests as human type.

No further reactor cattle have occurred in this herd in 5 years since the 2 infected farm workers left the premises.

Laboratory Tests

Acid-fast bacilli were found in films of the lesions in the bronchial lymph node of the calf.

Material from the lesions was treated with oxalic acid and inoculated intramuscularly into 2 guinea-pigs. Three weeks after inoculation single intradermal comparative tuberculin tests on the guinea-pigs have specific mammalian reactions. At necropsy 6 weeks after inoculation both had generalised tuberculosis.

The treated material from the calf lesions was also cultured on Dorset's egg and Lowenstein-Jensen media and colonies of acid-fast bacilli were visible in 28 days. Growth was dysgonic and better on Dorset's egg medium, with approximately 50 colonies per tube at 6 weeks, than on Lowenstein-Jensen medium with less than 20 colonies. The colonies appeared rather dry and flat but, apart from these factors, the characteristics of the primary cultures were not unlike those of the bovine type tubercle bacillus. Subculture on various media produced a more profuse dry spreading growth of acid-fast bacilli with characteristics of the human type tubercle bacillus.

The virulence of the organism recovered on primary culture was tested by further animal inoculations. Two guinea-pigs were inoculated intramuscularly with 1 mg. of moist culture and 2 rabbits intravenously with 0·01 mg. The guinea pigs developed open leg lesions and were killed 4 weeks after inoculation with generalised tuberculosis. The rabbits were killed at 12 weeks and showed no apparent abnormality on *post-mortem* examination. Human type growth was also obtained on culture media from the lesions in the guinea-pigs.

From the results of these biological and cultural tests the organism was classified as *M. tuberculosis*, human type.

A small portion of tissue was selected from the periphery of the main lesion in the bronchial lymph node of the calf for histological examination. Several areas of caseation necrosis were present with epithelioid cell proliferation, giant cells and infiltration of lymphocytes.

Biological and cultural tests of a culture from the first farm worker demonstrated the organisms to be tubercle bacilli of the human type.

Case No. 2

History and Post-mortem *Findings*

The herd consisted of 227 pedigree Red Poll cattle, all homebred except for 2 bulls, and since becoming attested 9 years previously only 5 animals had given positive reactions to the tuberculin test. In the 10th year 18 positive reactors and 17 inconclusive reactors were found at a herd test, mostly young cattle of 5 to6 months, which had been wintered in yards and had no contact with the milking cows. Some of these animals had been reared on cows and some fed from the bucket but tuberculin test results did not discriminate between these groups. Examination of the cattle failed to disclose any clinical evidence of tuberculosis and herd bulk milk samples were negative for tubercle bacilli.

All positive and inconclusive reactors, excepting 4 cows and one bull which gave inconclusive tuberculin reactions, were removed from the herd. Amongst the positive reactors was a 5-month-old male calf which was in good condition and had been bucket reared, receiving milk from the herd during its early life. This calf was slaughtered, *post-mortem* examination carried out and the retropharyngeal, sternal, bronchial, mediastinal, mesenteric and iliac lymph nodes submitted for laboratory examination.

The herd, including the 5 adult inconclusive reactors, was retested after 3 months, when 3 further positive reactors were found. Two of these belonged to the young group of cattle previously involved. The third reactor was a calf which was only 5 days old at the previous tuberculin test and which had had contact with reactors disclosed at that test and was housed in a shed where some of them had been. A possible milk infection was again eliminated by examination of the dam and nurse cows ; both milks were negative to biological tests in guinea-pigs.

The reactors were removed and a further herd test carried out after 2 months when all animals passed. Six weeks later the herd was disposed of by dispersal sale.

At the time of enquiry following the breakdown in the herd it was learned that one of the stockmen who was responsible for the young cattle during the previous 3 months had been a patient in a tuberculosis sanatorium. He had been discharged as cured and was apparently in good health at the time of appointment but was again unfit and was readmitted to hospital about 2 weeks after reactors were first disclosed in the herd. This man was sputum-positive at that time and the tubercle bacillus was classified in the Public Health Laboratory as human type. As a result of continuous streptomycin and isoniazid treatment the sputum of this patient became negative for tubercle bacilli and by the time the organism isolated from the calf had been confirmed as human

type, no positive material from the patient was available for further tests in this laboratory.

Laboratory Tests

Yellow caseous lesions, 2 to 3 mm. in diameter, were present throughout the retropharyngeal lymph nodes of the calf. Other lymph nodes received were sliced finely but no other lesions were found. No acid-fast bacilli were found in films of the retropharyngeal lesions. Material from these lymph nodes was inoculated into 2 guinea-pigs. These reacted to mammalian tuberculin when tested 3 weeks later. The guinea-pigs were killed 6 weeks after inoculation and generalised lesions of tuberculosis were found in both.

No acid-fast bacilli were recovered on primary culture from the calf lesions but a vigorous growth was obtained on solid egg media from the lesions in the guinea-pigs. The colonies of acid-fast bacilli, visible in 28 days, were dry and rough and more numerous on Lowenstein-Jensen medium with over 100 colonies per tube than on Dorset's egg medium with approximately 50 colonies. A bright yellow thick dry spreading growth of tubercle bacilli characteristic of the human type was obtained on subculture on various media.

Further animal inoculations were carried out with cultures. Two guinea-pigs were inoculated intramuscularly with 1 mg. and 2 rabbits intravenously with 0·01 mg. of culture. One guinea-pig died early from another cause but the other gave a positive reaction to mammalian tuberculin when tested at 3 weeks and when examined at necropsy 6 weeks after inoculation had generalised tuberculosis. The rabbits were killed at 8 and 12 weeks and on *post-mortem* examination showed no lesions of tuberculosis.

Histological examination of the retropharyngeal lymph node from the calf showed several areas of necrosis with proliferation of epithelioid cells and giant cell formation. Some early acute lesions of tuberculosis with infiltration of polymorphonuclear leucocytes were seen and one circumscribed lesion with a fibrous capsule and a centre of calcification.

Case No. 3.

History and Post-mortem *Findings*

The herd of 25 cattle had been attested for 4 years and free from infection until 2 homebred calves reacted at an annual tuberculin test. The reactors were removed from the premises and herd bulk milk samples examined and found negative for tubercle bacilli. A clear test of the herd was obtained after 60 days but 6 months later 7 positive reactors were found, again amongst the homebred young stock. Milk samples of the herd were again negative for tubercle bacilli.

The reactor animals were removed from the herd and 5 slaughtered for examination. No macroscopic lesions were found but samples of mesenteric lymph nodes from each of these 5 calves were submitted for laboratory examination.

Two further reactors were found at a herd test 3 months later. These animals, 1 heifer and 1 bullock, both 18 months old, had been purchased 2 and 3 months previously from 2 different attested herds, and housed with the young stock. These reactors were removed from the herd and sent for slaughter but unfortunately no veterinary examination was carried out *post mortem*. No macroscopic abnormality was reported as a result of routine meat inspection at the slaughterhouse. There were no further positive reactors at a herd test after 3 months ; 2 animals gave inconclusive reactions but were tuberculin-negative at retest 6 weeks later. After a further 6 months, 3 more positive reactors were found amongst the homebred young stock. These animals were slaughtered and lesions of tuberculosis were found in all 3, in the retropharyngeal, bronchial and mediastinal lymph nodes. Unfortunately material from these reactors was not made available for laboratory examination. There was still no clinical evidence of tuberculosis in the herd and biological tests on a herd bulk milk sample were negative. No positive reactors were found at retest of the herd after 60 days but 3 homebred young animals gave inconclusive reactions ; these became negative in 2 months.

It is an interesting fact that although all the reactors were among the homebred young stock, no definite source of infection in the herd could be traced. The herd was divided into 2 parts ; the cows were tied in a separate byre and attended by the owner's son, while the young stock were kept in a byre near the owner's house and were looked after by the owner himself. There was no available history of an infected person in contact with the cattle. The owner was known to be very ill during the period following the occurrence of reactors amongst the young cattle, but whether or not there had been a history of tuberculosis in the family could not be determined at that time.

One month after the last 3 inconclusive reactors were detected, the owner retired from farming and the herd was transferred to his sons. Since then 2 herd tests have been carried out and no further reactors found.

It has since been learned that the original owner died from respiratory tuberculosis 3 months after his retirement. He was first seen as a patient 11 months after reactors were found in his herd, when he had fairly advanced bilateral disease and his sputum contained human type tubercle bacilli. This patient was treated in hospital for 3 months but could not be persuaded to stay any longer. He continued treatment as an out-patient but showed little response and his sputum remained positive.

Laboratory Tests

No apparent abnormality was present in any of the 5 groups of mesenteric lymph nodes. Each group was treated separately and a suspension of each inoculated into 2 guinea-pigs. One pair of guinea-pigs reacted to mammalian tuberculin when tested 3 weeks later. These guinea-pigs were killed 4 weeks after inoculation and *post-mortem* examination revealed generalised tuberculosis in both. All the guinea-pigs inoculated with material from the other

4 calves gave negative tuberculin tests and showed no apparent abnormality at necropsy 6 weeks after inoculation.

The suspension of each group of lymph nodes was also inoculated into Dubos liquid medium. Cultures were negative for tubercle bacilli except for the material which was also positive in the guinea-pigs. In this case, after 3 weeks' incubation the medium contained acid-fast bacilli which were subcultured on to a modification of Stonebrink medium (Lesslie, 1959) on which a dry and granular growth of acid-fast bacilli was obtained in 21 days. Growth was dysgonic but the individual colonies appeared characteristic of the human type tubercle bacillus. Subculture on a number of different media produced a rich yellow eugonic growth typical of the human type bacillus.

Two guinea-pigs were inoculated intramuscularly with 1 mg. of culture and 2 rabbits intravenously with 0·01 mg. The guinea-pigs developed open lesions and at necropsy 4 weeks after inoculation both had generalised tuberculosis. The rabbits were killed at 12 weeks and showed no lesions of tuberculosis on *post-mortem* examination.

Case No. 4.

History and Post-mortem *Findings*

Two calves, 2 and 3 months old, gave positive tuberculin reactions at an annual herd test of a self-contained herd of 34 cattle, which had had no reactors since becoming attested 6 years previously. The increases in skin fold thickness following injection with avian and mammalian tuberculins respectively were in one calf 7 and 25 mm., and in the other calf 7 and 21 mm. A herd bulk milk sample was biologically negative for tubercle bacilli. Although the herd was virtually self-contained it had been the practice to purchase an occasional calf from attested sources for rearing. These 2 reactors had been purchased as newly born calves from the same attested herd. There was no history of infection in that herd. An attempt was made to trace the dams of the 2 calves for further examination but they had both been disposed of, one for slaughter. The reactor calves were removed from the herd and slaughtered but no veterinary examination was carried out *post mortem.*

At a 60 days herd test 8 further reactors were disclosed. Their ages ranged from 2 to 15 months, 4 of them being under 6 months old. Skin reactions were as follows :—

Reactor animals	*Avian tuberculin*	*Mammalian tuberculin*
No. 1. 5 months old female	8 mm.	24 mm.
No. 2. 2 „ „ „	4 „	31 „
No. 3. 15 „ „ „	4 „	23 „
No. 4. 12 „ „ „	2 „	8 „
No. 5. 10 „ „ „	2 „	18 „
No. 6. 7 „ „ „	2 „	20 „
No. 7. 4 „ „ „	2 „	15 „
No. 8. 3 „ „ „	2 „	7 „

All 8 reactors were slaughtered and *post-mortem* examinations carried out. Pinhead sized caseo-calcified lesions were found in a bronchial lymph node from both No. 1 and 2. No other macroscopic lesions were found in these animals or in any of the other 6. Two separate sets of material were submitted for laboratory examination, the bronchial lymph nodes from Nos. 1 and 2, and retropharyngeal, bronchial, mediastinal and mesenteric lymph nodes from the 6 reactors in which no lesions were found.

Biological examination of a further herd bulk milk sample was negative for tubercle bacilli. All cattle recently sold off the premises were traced. Seven cows had been sold during the 12 months prior to the disclosure of reactors in the herd ; these were all tested on the premises of their respective owners and in each case the test was negative. Two cows gave inconclusive reactions at a herd test 3 months later but were negative at retest after 5 weeks.

The owner of this herd had been under treatment for tuberculosis at a sanatorium within the previous 2 years. Samples of pleuritic effusion taken from him were found to contain human type tubercle bacilli and he had been requested to attend again at the sanatorium but had not done so. At the time of enquiry into the source of infection in the herd, the owner was extremely thin, almost to the point of emaciation, and respiratory distress was evident after the slightest exertion. His health did not improve and following further evidence of open lesions from sputum examination, he was readmitted to the sanatorium 2 months after the last tuberculin reactions were observed in the cattle and he is still there under treatment. The stock have been attended by a brother and this management is continuing. Since then 3 successive herd tests have been carried out at intervals of 6 months and no further reactors have been found.

Laboratory Tests

Acid-fast bacilli were seen in direct films from the lesions in the bronchial lymph nodes of calves Nos. 1 and 2. Material from these lesions was inoculated intramuscularly into 2 guinea-pigs. One guinea-pig developed an open lesion at the site of inoculation 19 days later and was killed. *Post-mortem* examination revealed generalised tuberculosis. The other guinea-pig reacted to mammalian tuberculin when tested at 20 days and at necropsy the day after generalised lesions of tuberculosis were found.

The material from the calf lesions was also cultured on Dorset's egg, Lowenstein-Jensen and Stonebrink media. No growth was obtained on Dorset's egg medium but colonies of acid-fast bacilli were visible on Lowenstein-Jensen and Stonebrink media in 21 days. Growth was dysgonic with up to 50 colonies per tube on Lowenstein-Jensen medium and approximately 100 colonies on Stonebrink medium after 6 weeks. On subculture the growth of this strain developed into the dry eugonic form of the human type bacillus.

Pieces of bronchial lymph node from both animals were selected for histological examination. In the sections from calf No. 1 there were caseous areas with

some calcification surrounded by epithelioid cells and lymphocytes and with strands of fibrous tissue around the periphery of the lesions ; in sections from calf No. 2 there were numerous foci of epithelioid cell proliferation with giant cell formation and infiltration of lymphocytes.

The lymph nodes from the 6 other reactor calves were sliced finely in the laboratory. There were petechial haemorrhages in some lymph nodes and several pinhead sized parasitic abscesses in the mesenteric nodes but no other evidence of abnormality was found. Portions of the lymph nodes were ground up and a suspension inoculated intramuscularly into 2 guinea-pigs which had generalised tuberculosis when killed 6 weeks later.

Primary cultures of the lymph nodes from the 6 calves were negative on Dorset's egg medium but a dysgonic growth of up to 20 colonies of acid-fast bacilli per tube was obtained on Lowenstein-Jensen and Stonebrink media. These colonies grew very slowly and resembled those of the bovine type tubercle bacillus but subcultures showed the typical eugonic growth of the human type.

The virulence of each of these 2 strains recovered on culture was tested by inoculating 2 guinea-pigs intramuscularly and 2 rabbits intravenously with 0·01 mg. of culture. The guinea-pigs all gave specific reactions to mammalian tuberculin when tested after 3 weeks and necropsy at 5 weeks demonstrated generalised lesions of tuberculosis. The 4 rabbits were all killed 12 weeks after inoculation. One had a single pale area, approximately 2 mm. in diameter, in the cortex of one kidney and acid-fast bacilli were seen in films of this lesion. No other abnormality was found in the carcase of this rabbit or in any of the other 3.

Case No. 5.

History and Post-mortem *Findings*

Two 3-month-old homebred calves reacted at an annual tuberculin test of a small self-contained herd comprising 19 cattle, which had been attested for only 12 months. The skin reactions to avian and mammalian tuberculins respectively were in one calf 6 and 22 mm., and in the other calf 11 and 34 mm. The reactors were removed from the herd and sent for slaughter but no veterinary examination was carried out *post mortem*. These calves had been fed raw milk only from their respective dams. No clinical evidence of tuberculosis was found in the herd. A group milk sample from the dams of the reactor calves and another from the remaining 9 cows in milk were biologically negative for tubercle bacilli. At a herd test 11 weeks later 2 further reactors were found amongst the homebred calves. One, a 4-month-old heifer, had been included in the previous herd test and had given negative results to both tuberculins. At the retest of the herd her reactions were 6 and 22 mm. to avian and mammalian tuberculins respectively. This calf was sold for slaughter out of the area and unfortunately no veterinary examination was carried out *post mortem*. The other reactor was a 2-month-old heifer calf born since the previous herd test and she reacted 2 and 16 mm. to avian and mammalian tuberculins respectively. This calf was slaughtered for examination. No macroscopic lesions were found but the retropharyngeal, bronchial, mediastinal and mesenteric lymph nodes and a tonsil were submitted for laboratory examination.

During enquiries into the history of the herd to determine the source of infection it was learned that the owner had been in poor health for some months and had been admitted to hospital about a month before the second herd test at which reactors were found. The owner had direct contact with all 4 reactor calves during the period of his illness, including the 2-month-old calf which was examined *post mortem*, during the first few weeks of its life. The owner was suffering from pulmonary tuberculosis and since his sputum was strongly positive for tubercle bacilli, the medical officer in charge of his case was interested to have further information about the infection in the reactor calves.

Laboratory Tests

The material from the calf was examined carefully but no macroscopic abnormality was found. Portions of the lymph nodes and tonsil were ground up, treated with oxalic acid, and a suspension inoculated intramuscularly into 2 guinea-pigs. These reacted to mammalian tuberculin when tested 3 weeks later and at necropsy 4 weeks after inoculation both had generalised lesions of tuberculosis.

Primary cultures of the material from the calf were contaminated but a growth of acid-fast bacilli was obtained on Dorset's egg, Lowenstein-Jensen and Stonebrink media from the lesions in the guinea-pigs. Colonies were visible on all tubes in 28 days and although over 100 colonies were growing on the tubes of both Lowenstein-Jensen and Stonebrink media, growth was dysgonic and not unlike that of the bovine type tubercle bacillus. Subcultures on various media produced a bright yellow dry thick eugonic growth of tubercle bacilli characteristic of the human type.

Further typing of the organism was carried out by inoculating 2 guinea-pigs intramuscularly with 1 mg. of culture and 2 rabbits intravenously with 0·01 mg. Both guinea-pigs gave specific mammalian tuberculin reactions 3 weeks after inoculation and when killed at 4 weeks had generalised tuberculosis. One rabbit was killed at 10 weeks and showed no evidence of tuberculosis *post mortem*. Necropsy of the other rabbit 12 weeks after inoculation revealed a single pale caseous nodule, approximately 1 mm. in diameter, in the cortex of each kidney. Acid-fast bacilli were demonstrated in films of these lesions. No other abnormality was found in the carcase.

The sputum of the owner, examined in the hospital laboratory, was found to contain a strain of human type tubercle bacilli with a distinctive drug sensitivity pattern. In an attempt to identify this strain with that isolated from the calf, the drug sensitivity patterns were compared and were sufficiently alike to suggest that the owner was, in fact, the source of infection in the calf (see Table I).

TABLE I

Drug concentration in Lowenstein-Jensen medium (as added before inspissation)	Strain ex owner	Strain ex calf	Standard strain (H37 Rv)
Streptomycin			
6 μg. per ml.	Moderate growth	Light growth	Nil
20 μg. per ml.	5 colonies	3 colonies	Nil
200 μg. per ml.	Nil	Nil	Nil
P.A.S.			
1 μg. per ml.	Light growth	Light growth	Nil
5 μg. per ml.	Nil	12 colonies	Nil
25 μg. per ml.	Nil	Nil	Nil
Isoniazid			
0·2 μg. per ml.	Nil	5 colonies	Nil
1·0 μg. per ml.	Nil	Nil	Nil
5·0 μg. per ml.	Nil	Nil	Nil
Negative control	Confluent growth	Moderate growth	Moderate growth

Normal bovine type strains do not grow on any of the above drug concentrations except on 1 μg. per ml. of P.A.S.

Discussion

The findings reported here are of particular interest in view of the rapid progress towards complete attestation in Great Britain.

Although the positive biological and cultural results of the laboratory examination on the bulked lymph nodes from the group of 6 " no visible lesion " reactors in case No. 4 does not prove that more than one of these animals was actually infected, it seems probable from the history of the herd and the tuberculin reactions in these animals that they were in fact all sensitised by the same strain of human type tubercle bacillus. In the circumstances, it seems reasonable to assume that all 12 animals in the 5 herds were infected with human type bacilli and these comprise 0·6 per cent. of the 1990 reactors in attested herds from which material was examined in the laboratory during the period of 6 years. In addition to these 12 there were another 36 reactors in these 5 herds apparently sensitised by the human type bacillus but material was not sent for examination. Specimens from 660 (33 per cent.) of the 1990 reactors were found to contain tubercle bacilli of the bovine type, and avian type was recovered from another 30 (1·5 per cent.).

Natural infection with human type tubercle bacilli does not produce a progressive disease in cattle but a quickly healing infection. At necropsy 4 of the 12 calves had small lesions in the respiratory or alimentary systems whilst the other 8 had no macroscopic lesions. These findings are similar to those reported by Stenius (1938), Hillermark (1942 and 1945) and McKinstry & Blampied (1955) of cattle being sensitised to the tuberculin test by human type infection without the production of macroscopic lesions in the body.

In all of the 5 herds a history of an infected person working in contact with the cattle was confirmed. No further reactors occurred in any of these herds after the removal of the known human source of infection. Definite reactions occurred only in animals under 18 months old probably because of the greater chance of infection from the handling of young stock and the close contact between attendant and calves especially at feeding.

Sensitivity to mammalian tuberculin was marked in many reactors in these herds but in those animals which were retested it was found to be of short duration. This is well illustrated in case No. 1 where over a period of 5 months immediately prior to slaughter, the tuberculin reaction in the calf changed from that of a marked specific mammalian sensitivity to one with a slight sensitivity to both avian and mammalian tuberculins, on which test result the animal would have been passed on a basis of interpretation with non-specific infection established in the herd. The tuberculin testing records in these 5 herds indicate that when infection with human type tubercle bacilli is introduced into a previously clean herd, the herd tuberculin test often shows a greater proportion of slight reactions than if the stock were infected with bovine type. During the period of the herd breakdowns in cases Nos. 2, 3 and 4, a total of 29 animals gave inconclusive reactions to tuberculin tests ; 17 of these were sold but 12 were retested and became negative within 2 months. These animals might well have been sensitised by the human type tubercle bacillus but the period between infection and tuberculin tests might have been such that sensitivity was not so marked, and by the time of retest of the 12 animals, had waned sufficiently to give a negative tuberculin reaction.

It appears that in an attested herd infection with human type tubercle bacilli from an attendant is important as a cause of reactors rather than as a producer of active tuberculosis. Its presence complicates tuberculin testing since it is not possible by the methods at present in use to differentiate between sensitisations caused by the human and bovine types of the organism. When many unexplained positive reactors suddenly appear at a routine tuberculin test of a previously clean herd, and particularly when reactions are mainly in the young stock, the possibility of a human infection should be considered. Sensitisation of cattle by the human type bacillus is of comparatively short duration and provided the human source of infection is removed, the reactivity will wane and a differential diagnosis may eventually be made by repeated testing (Nielsen & Plum, 1940a*; Stenius, 1949).

In experimental infection of cows it has been shown that the milk may contain living human type tubercle bacilli (Griffith, 1913) and in recent years findings by Mitscherlich and Reuss (1953), Nassal (1956) and Schliesser (1958) have shown that naturally acquired infections in cattle with tubercle bacilli of the human type may lead to the excretion of the bacilli in the milk from apparently normal udders. Therefore, this type of infection should not be regarded as safe and it must be accepted that, even though cattle are resistant to human type bacilli, infected cows may act as a source of infection for other cattle and human beings. The possible direct

contamination of milk by a tuberculous person during milking or the handling of the milk is also important.

There is, of course, grave danger of cattle becoming infected if an attendant has open pulmonary tuberculosis caused by the bovine type bacillus. Nielsen and Plum (1940b), Griffith and Munro (1943), Tice (1944) and Sjollema and Schaaf (1951) have all reported cases where cows may have been infected with bovine type tubercle bacilli from human sources. Some cases of infection in cattle with bovine type bacilli occur in attested herds where there is suspicion of spread from an attendant. These are often not followed up owing to the difficulty in obtaining cultures from human patients for typing and for comparative tests with the organisms isolated from the infected animals. Two such cases have been investigated recently in this country, where there was strong circumstantial evidence of a human to bovine transfer of an infection with bovine type tubercle bacilli.

In the fight against tuberculosis close co-operation between the medical and veterinary professions is most important and it is suggested that physicians in charge of chest clinics should report to the regional veterinary officer all cases of tuberculosis diagnosed in people known to be working with livestock, and of open tuberculosis in human beings caused by the bovine type bacillus. When infection in a herd is suspected of coming from a human source, the veterinary surgeon should inform the medical officer of health so that he may attempt to trace the infective person on the farm.

In most of the cases reported here it was not known until reactors were disclosed in the herd that an infected person was in contact with the cattle but, when properly used, the legislation dealing with milk can be of considerable assistance. The law is quite specific on certain points and it is an offence under Article 4 of the Public Health (Prevention of Tuberculosis) Regulations, 1925, for a person who is aware that he is suffering from tuberculosis of the respiratory tract to enter upon any employment or occupation in connection with a dairy which would involve the milking of cows, the treatment of milk, or the handling of vessels used for containing milk. Article 5 of the same regulations empowers a local authority to require a person to discontinue any such employment or occupation if they are satisfied on the report of their medical officer of health that the person is suffering from tuberculosis of the respiratory tract and is in an infectious state. Further to this, Regulation 19 of the Milk & Dairies Regulations, 1949, states that where the medical officer of health of a district has cause to suspect that any of the persons in or about any registered premises who have access to the milk or to the churns or other milk receptacles is suffering from or has recently been in contact with a person suffering from a disease liable to cause infection of milk or is in such a condition that there is a danger of his causing the milk to become infected, he may give notice to the occupier of such premises that he considers it necessary to make an examination of any or all of such persons ; and where he gives such notice the said occupier and every person concerned shall give to the medical officer of health all reasonable facilities for making such examination. Legislation similar to the above is also in force in Scotland.

Typing of the organisms isolated from all these cases was based on a combination of cultural and biological tests. No growth was obtained on primary culture from 2 calves and in these cases cultures were obtained from guinea-pig lesions. In all other cases primary growth from bovine tissues was slow and dysgonic even on media containing glycerol, and it was only after subculture that these strains developed into the dry eugonic form of the human type bacillus. They all dissociated to the eugonic form after one transfer. The virulence of these dysgonic human strains was found to be the same as for typical human strains. This demonstrates the importance of careful typing of tubercle bacilli isolated in the laboratory since the growth and morphology of colonies of human type bacilli on primary culture from bovine tissues may not be characteristic.

The results of sensitivity tests carried out on the tubercle bacilli isolated from the calf and the infected human contact in case No. 5 show the value of drug sensitivity patterns for the comparison and possible identification of strains of human type tubercle bacilli in cases of this nature.

Acknowledgments.—I wish to thank those veterinary surgeons in private practice and on the permanent staff of the Ministry of Agriculture, Fisheries & Food, who submitted material for laboratory examination and provided information on the history and *post-mortem* findings of the cases described. My thanks go also to Dr. J. Marks, M.D., M.R.C.P., DIP. BACT., Director, Central Tuberculosis Laboratory, Cardiff, who carried out the sensitivity tests recorded in Case No. 5, and to Mr. K. W. Luery for technical assistance throughout this work.

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Current Literature

ABSTRACTS

Clinical and Experimental Investigations into a Post-parturient Syndrome with Agalactia in Sows. RINGARP, NILS (1960). *Acta Agric. Scand.* Suppl. 7.

This thesis is a massive work comprising clinical, laboratory, and experimental investigations into agalactia in the sow. It contains sufficient material for 3 separate theses and the amazing thing is that it is the product not of a full-time research worker but of a practising veterinary surgeon. The references alone cover 10 pages. Anyone interested in field research, in whatever species, would be well advised to study this thesis.

In the introduction the author describes the 5 types of agalactia which he has observed. The incidence of each type in a group of 1,180 cases of agalactia is given in brackets. (1) With eclampsia (0-59 per cent.). (2) Disturbance of the neurohormonal regulation of the milk ejection reflex (3.30 per cent.). These cases respond to oxytocin. (3) Udder hypoplasia (1.53 per cent.). (4) Hormonal or symptom-free agalactia which does not fit into groups 2 or 3 (6.02 per cent.). This type develops into type 5. (5) This is the most important group, containing 88.56 per cent. of all cases. The sow is healthy and suckles her piglets for 12 to 24 hours (at most 36 to 48 hours) after farrowing. This is followed by a great variety of symptoms in all parts of the body but usually affecting the udder and genital tract, and at this stage agalactia supervenes. The author calls this condition agalactia toxaemica. The symptoms observed in agalactia toxaemica have been described in the literature under a great variety of names—puerperal septicaemia, post-parturient or puerperal fever, milk fever syndrome, hypopituitarism, *Bact. coli* infection, mastitis, metritis, "excess protein feeding," and simply agalactia. The author considers that all these conditions are part of the agalactia toxaemica syndrome. An excellent review of the literature follows. Detailed results of clinical, chemical, bacteriological, pathological, and histological examinations are given.

The incidence of agalactia toxaemica in the author's practice, in which there are about 4,400 sows, mostly Swedish Landrace, was 3.7 per cent. of all farrowings. In a 2-year period (1957-8) there were cases in 238 of 700 piggeries. The incidence was affected by season, being highest in April, July, August, September, and October, and lowest in January and February. The size of the piggery had no effect on the incidence. The incidence was very low in gilts farrowing for the first time and was highest at the third and second farrowing. Sows which developed agalactia had a gestation period one day longer than normal sows. The duration of farrowing was longer in sows which developed agalactia than in normal sows. Sows with agalactia had larger litters (number of piglets born) than normal sows. The erythrocyte sedimentation rate was examined 2 to 3 days prior to farrowing. Sows which subsequently developed agalactia toxaemica had an increased erythrocyte sedimentation rate at 1 and 24 hours. The piglet mortality rate at 3 weeks old was compared in litters in sows which were treated according to accepted methods (antibacterial drugs + oxytocin) and by accepted methods plus the glycocorticosteroid prednisolone. The respective piglet mortality rates were 30.6 per cent. and 23.0 per cent. The 3-week piglet mortality rate in healthy sows was 17.3 per cent. It was impossible to collect sufficient data to assess to what extent the condition was hereditary, but a number of observations were made which suggested that the disease may be partly hereditary.

Working on the hypothesis that agalactia toxaemica was a toxaemia of gastro-intestinal origin associated with the stress of gestation and farrowing the author made the following experiments. The disease was produced by (1) drastic feeding changes shortly before farrowing; (2) feeding fodder of poor hygienic quality for 2 to 3 weeks before farrowing; (3) daily administration of an intestinal anti-peristaltic agent (opium) for 1 week prior to farrowing; (4) feeding large quantities of skim milk (excess protein) for the last 8 to 10 days before farrowing (only partially successful); (5) feeding of methylthiouracil (goitrogenic); and (6) abrupt cessation 2 to 3 days before farrowing of a long course of treatment with massive doses of corticosteroids (this was to simulate stress). The introduction into the uterus of cultures and suspensions of bacteria from the udder and uterus of spontaneous cases of agalactia toxaemica did not produce the syndrome. Attempts to produce agalactia toxaemica by the procedures used in Experiments 1 to 4, five days after farrowing, did not produce agalactia. This suggests that the stress of late pregnancy and farrowing are necessary predisposing factors. In these experiments a number of preventive measures were also applied. Treatment with polyvalent coliserum prior to farrowing prevented the occurrence of the syndrome. Oral administration of streptomycin, especially combined with aperients, prevented the occurrence of the disease to a large extent. Further experiments showed that sows which were especially susceptible to agalactia toxaemica had an abnormal blood sugar regulating mechanism.

Among his conclusions the author states:—

(a) Intoxications and/or infections of gastro-intestinal origin are an integral part of the aetiology. Predisposing factors for these are mainly feed and feeding hygiene deficiencies and certain faults and deficiencies in the general management and care of the animals.

(b) The manifest case of agalactia toxaemica is to a certain extent an exacerbation of a disturbance or a disease which in a latent form existed in the sow prior to farrowing.

(c) In the treatment of agalactia toxaemica the use of glycocorticosteroids (prednisolone) is of great value in support of other lines of treatment because it has been shown to reduce the suckling piglet mortality rate associated with the syndrome. **H. B.**

The Oestrogenic Content of Red Clover. SIMON, P. A. (1959). *Indian Vet. J.* **36.** 420.

The estimation of the oestrogenic content of red clover by bioassay is described, as this method is more convenient than chemical analysis or the absorptiometric, spectrophotometric, or chromatographic methods.

The red clover was cut before flowering, and dried, and the oestrogen extracted by mixing 50 g. of dried ground clover with 300 ml. of 95 per cent. ethanol in a decanter. This material was heated to a temperature of 100° C. within 30 minutes, then held at 60° C. for 1½ hours, and afterwards cooled and filtered by suction. The process was repeated with the residue to ensure complete extraction, and then both the filtrates were mixed and evaporated until the mixture became viscous. This concentrated residue was mixed with a basal mouse ration so that 1 g. of this diet corresponded to 1 g. of dried plant material.

Thirty immature female mice 20-21 days of age were divided into 6 groups of 5 each. The first group received the basal ration only, the second the prepared diet containing the red clover extract, and the other 4 the basal ration plus 0.2 mcg., 0.3 mcg., 0.4 mcg., and 0.5 mcg. of diethyl stilboestrol respectively. At the end of 72 hours the mice were starved for 8 hours, weighed, and killed. The ovaries, fallopian tubes, and uteri were dissected out and weighed, and the weight of the uterus and these associated structures was expressed as a percentage of the body-weight in each case. By comparing the percentage increases in the utero-ovarian weights obtained by the various groups it was possible to calculate the percentage of diethyl stilboestrol equivalent in the dried red clover.

It was found that 100 lb. of red clover had an oestrogenic activity equal to 0.7 mg. of diethyl stilboestrol, but the amounts of oestrogens vary greatly in the same plant during different seasons and stages of growth.

J. O. L. K.

Contamination of Wholesale Meat Supplies with Salmonellae and Heat-resistant *Clostridium welchii*. HOBBS, BETTY C., & WILSON, J. GREENWOOD. (1959). *Mon. Bull. Minist. Hlth. Lab. Serv.* **18.** 198.

Samples of imported frozen boneless meat and imported chilled carcases collected at the Port of London and in Smithfield market were examined for Salmonellae and heat-resistant *Cl. welchii* (the kind that are usually incriminated in outbreaks of *Cl. welchii* food poisoning). Salmonellae were found in 92 of 890 (10.3 per cent.) samples of boneless meat and in 13 of 304 (4.3 per cent.) samples of chilled carcase meat that were examined.

Heat-resistant *Cl. welchii* were isolated from 76 of 722 (10.5 per cent.) samples of boneless meat and 3 of 195 (1.5 per cent.) samples of meat from carcases.

Frozen boneless veal yielded the highest isolation rate for Salmonellae, 18.0 per cent. of the specimens imported from one country and 12.5 per cent. from another. Salmonellae were also found in boneless beef, boneless mutton, carcase veal, and carcase beef, but not in carcase mutton. The number of specimens of pork examined was insufficient to draw any conclusions.

Salmonella typhimurium was by far the most common Salmonella type isolated. It was notable that *S. dublin* was not found in any of the specimens of meat examined.

H. W.-S.

Salmonellae in Imported Meat. *The Lancet*. 1960. Vol. 1. 478.

The annotation is inspired by an article in the Monthly Bulletin of the Ministry of Health Laboratory Service, December, 1959, by Dr. Betty Hobbs and Dr. Greenwood Wilson.

Although meat in some form or other has been shown to be responsible for the majority of cases of food poisoning caused by Salmonellae, the reason for this has been obscure. Salmonella infections are not common in food animals, and Salmonellae are infrequently detected in home-produced meat. (However, evidence is accumulating which shows that salmonellosis is more common in some food animals than had previously been suspected: *Abstractor's note.*) The paper referred to suggests a possible explanation for this phenomenon.

Samples taken from whole carcases and from boneless meat showed that 3.4 per cent. of boneless meat samples contained *Salmonella* spp. 18 per cent. of samples of boneless veal from one country were infected. *Salmonella typhi-murium* was the most common of the species isolated. *S. dublin* was not isolated though it is the commonest cause of salmonellosis of cattle in this country. None of the exotic species recently isolated from imported feedingstuffs was found. This may suggest that the Salmonellae were not derived from the animal itself, but were post-slaughter contaminants. But the method of contamination remains obscure, and knowledge is limited. It would be of great benefit if the veterinary profession would undertake an extensive survey of the infection of carcase meat with Salmonellae in this country.

The dangers to public health arise more from made-up meats than from cuts off the joint as the latter are usually sterilised in the cooking process. Infections might be expected to be much higher, but most people are probably resistant to all but enormous doses of Salmonellae, with the exception of *Salmonella typhimurium*.

Importation of salmonella-infected meat should be prevented as far as possible. The Imported Food Regulations, 1937 to 1948, may or may not apply. Sterilisation by gamma irradiation is a possibility, but the whole problem of imported Salmonellae deserves the attention of the Ministry of Health and the Board of Trade. (And the Ministry of Agriculture, Fisheries and Food!: *Abstractor's note.*)

R. V. B.

B.V.A. Annual Congress: Glasgow 1960

For the benefit of intending delegates to the Congress which is to be held in Glasgow from August 28th to September 3rd, a list of hotels is appended. The Provisional Committee wish to make it known that there is some urgency in this matter because the tourist season will open before long and heavy bookings are being received by the city hotels. As well as the accommodation tabulated below, a number of rooms are available for men only in the University hostels which, although less congenial than the hotels, are conveniently sited and have a lower tariff (bed and breakfast 20s.). Any members who wish to make reservations in hostels are asked to inform the honorary local secretary, B.V.A. Congress, University of Glasgow Veterinary School, 83 Buccleuch Street, Glasgow, C.3.

Some members, and particularly those with families, may like to take advantage of the holiday facilities on the Clyde coast although it should be noted that one day of Congress week will be occupied by a sail from Glasgow on the river and firth. Of the resorts, Helensburgh, Gourock and Wemyss Bay have most to recommend them ; they are points of embarkation for steamers and are within 40 to 60 minutes of Glasgow by train or road.

Those who intend to make Congress part of a holiday in Scotland will find useful information in the publications, Holiday Guide to Scotland (price 1s. 6d., British Railways), and Where to Stay in Scotland (price 2s. 6d., Scottish Tourist Board, 2, Rutland Place, Edinburgh, 1). It may be of interest, too, that the International Festival will be held in Edinburgh from August 21st to September 10th. An excursion to the Military Tattoo at Edinburgh Castle is being arranged during Congress week.

Further information on accommodation or other amenities in Glasgow and surrounding district may be obtained from the honorary local secretary.

GLASGOW HOTELS

Hotel and Address	Telephone	No. rooms currently available		Terms B & B from	Miles from University	
		Double	Single			
Central Area						
Central Hotel, Gordon Street (Headquarters hotel) ...	Central 9680	20	20	53/–	2	L
Allan's, 931 Sauchiehall Street, C.3	Western 4112	25	5	22/6	1½	LC
Bath Hotel, 152 Bath Street, C.2	Douglas 7416	11	22	30/–	1½	LC
Bon-Accord Hotel, 7 Park Terrace, C.3	Douglas 2481	6	3	25/–	1	LC
George Hotel, 235 Buchanan Street, C.1	Douglas 6622	16	10	35/6	2	LC
Green's Hotel, 22 Woodlands Terrace, C.3	Douglas 4976	4	0	30/–	1½	UC
Ivanhoe Hotel, 185 Buchanan Street, C.2	Douglas 7284	20	5	33/–	2	L
Kenilworth Hotel, 5 Queen Street, C.1	Central 5151	10	10	27/6	2	LC
Linden Hotel, 19/20 Woodside Terrace, C.3	Douglas 4600	30	0	22/6	1	LC
More's Hotel, India Street, C.2	Central 2641	5	2	39/6	1	LC
North British Hotel, George Square	Douglas 6711	25	20	44/–	2	L
Park Gate Hotel, 1/3 Park Gate, C.3...	Douglas 0810	16	0	25/–	1	LC
Royal Hotel, 106 Sauchiehall Street, C.2	Douglas 3416	10	0	36/–	2	LC
St. Enoch Hotel, St. Enoch Square, C.1	Central 7033	30	20	40/–	2	L
Woodlands Gate Hotel, 10/11 Lynedoch Place, C.3 ...	Douglas 6123	6	0	21/–	1	UC
Western Area						
Belhaven Hotel, 23 Belhaven Terrace	Western 7307	8	3	30/–	1	UC
Benervie House Private Hotel, 15 Buckingham Terrace, Great Western Road	Western 7143	6	2	17/6	1	UC
Botanic Gardens Hotel, 6/7 Grosvenor Terrace, W.2 ...	Western 2888	8	4	21/–	1	UC
Cleveden Gate Hotel, 14 Hyndland Road, W.2.	Western 6153	5	2	21/–	2	UC
Devonshire Hotel, 5 Devonshire Gardens, W.2	Kelvin 1308	5	5	22/6	1½	UC
Great Western Hotel, 11/12 Botanic Crescent, N.W. ...	Maryhill 1287	10	6	22/6	1	UC
Kensington Hotel, 12 Kensington Gate, W.2	Western 6466	5	5	21/–	1½	UC
Peripheral						
Boulevard Hotel, Great Western Road, Clydebank ...	Duntocher 2381	4	4	35/–	5	L
Buchanan Arms, Drymen, Stirlingshire	Drymen 310 & 270	4	0	35/–	28	L

L = Licensed. U = Unlicensed. C = Some reduction for children been specified.

NOTE.—Members are asked to mention the British Veterinary Association when making hotel reservations.

News and Comment

SECOND PETER WILSON BEQUEST LECTURE

This lecture was delivered at the Royal (Dick) School of Veterinary Studies. In introducing the essayist, Professor Robertson, who presided, said:—

"The speaker in the second of our series of Peter Wilson Bequest Lectures, Dr. A. T. Phillipson, needs no introduction to a veterinary audience for he is already widely known throughout the profession for an almost single-minded devotion to one aspect of our work, namely, veterinary physiology, especially ruminant physiology. He has worked in this field at Cambridge and later in Aberdeen ever since he qualified as a veterinary surgeon nearly 25 years ago. The importance of his work in the field of ruminant digestion and absorption has been widely recognised and has attracted workers from all parts of the world to join him. It has also led him far afield to lecture and advise on research activities in his chosen sphere.

"Unlike some successful scientists, Dr. Phillipson has never lost interest in veterinary professional activities and has always been ready to put his specialised knowledge and experience at the disposal of veterinary societies and organisations. It was this, along with his reputation as a research worker, which led the British Veterinary Association to award him last year the Dalrymple-Champneys Cup and Medal for outstanding service to the veterinary profession. I am sure that you will agree with me, therefore, that the Board of Veterinary Studies chose wisely when it invited him to give this lecture.

"Dr. Phillipson has chosen to deal in this lecture with nutrition, a field which the veterinary profession has all too frequently tended to ignore, except in so far as the factors concerned could be incorporated in a bottle or pill or be administered by syringe. It is both surprising and gratifying, therefore, to find a member of our profession holding, as Dr. Phillipson does, the post of Deputy Director in the major institute concerned with animal nutrition in this country, the Rowett Research Institute. It is particularly fitting, therefore, that he should be the one to talk to us on this subject, and on your behalf I welcome him here and ask him to address you on *The Nutrition of Ruminants*."

THE BRITISH TURKEY FEDERATION

The British Turkey Federation held their ninth annual conference at Eastbourne last month, and this was extremely well attended.

Dr. W. M. McKay gave an address at the opening session of the conference on the work done by the Breeding and Research sub-Committee, of which he is chairman; he also was chairman of the paper given by E. G. Harry on "The Influence of Management on Disease." Dr. R. F. Gordon was chairman of the paper given by Israel's Chief Poultry Keeping Officer, Mr. A. Thumim, on "Artificial Insemination." Other veterinarians present at the conference included Dr. W. P. Blount, Mr. J. M. S. Lucas, Mr. G. N. Henderson, Mr. N. Comben, and Mr. W. W. C. Gibson. Papers read during the conference by personalities in the poultry industry well known to the veterinary profession were: "Agribusiness," by G. Sykes; "Hygiene Considerations in Processing Turkeys," by Morley T. Parry; "Problems for the Breeders Engaged in Continuous Production," by Dr. G. A. Clayton; and "Problems for the Grower Engaged in Continuous Production," by Dr. Howard F. Kratzer, Professor of Poultry Husbandry at the University of California.

FARM PRICE GUARANTEES

The "Annual Review and Determination of Guarantees," published last week by H.M. Stationery Office, makes a reduction of some £9 million in the agricultural subsidy for the year March, 1960, to March, 1961. Commenting on this year's Annual Review, a joint announcement by the Agricultural Departments in the United Kingdom includes the following points.

The industry's output has continued to expand. If present trends continue, demand is unlikely to increase as rapidly as total supplies, though there are differences between the individual commodities. As the Government have emphasised in recent years, the industry must increasingly turn its attention to reducing costs of production and to getting the best returns from the market. The industry's success, both for itself and for the nation, depends now primarily on the extent to which it can improve its technical and business efficiency and is not to be measured by volume of output alone.

Within this framework of general policy the particular aims should be as follows:—

(i) Continuing emphasis on the better production and use of grass as a means towards reducing costs of production;

(ii) although barley and oats are in general to be preferred to wheat, the extent to which particular cereal crops are produced should depend on the economics of the individual farm;

(iii) for milk the aim should be to gear production to a level more closely in line with requirements for liquid consumption, including the necessary reserve;

(iv) the output of eggs should be reduced;

(v) for beef the aim at present should be to maintain the rate of expansion of production now in prospect, with continued emphasis on producing the quality wanted by the market and at reasonable prices;

(vi) for mutton and lamb the need is to check expansion and to concentrate on producing the type of animal the housewife wants;

(vii) for pigs the aims should be to secure a moderate increase in the breeding herd, but to avoid an increase to a level which would put an unreasonable burden on the taxpayer.

The Government have increased the guaranteed prices of pigs and potatoes; for cattle, duck eggs, and rye there is no change. They have reduced the guaranteed prices of sheep, wool, milk, hen eggs, the main cereal crops and sugar beet. The standard quantity of milk qualifying for the guarantee will

in future be adjusted automatically according to changes in liquid sales to provide an incentive to the industry to increase such sales. The quality premiums for pigs sold to bacon factories will continue at the existing rates but in future they will be additional to, and will not be included in the calculation of the general guarantee of all pigs; the effect will be the same as if the guaranteed price for all pigs had been increased by 6d. a score. With the increase of 3d. per score in the guaranteed price the value of the guarantee to all pig producers is effectively increased by 9d. per score. The stabilising bands are being narrowed from 3s. to 2s. 3d. per score on either side of the guaranteed price. This will provide more stability for pig producers and a basis on which long-term contracts can be developed.

Mr. Harold Woolley, president of the National Farmers' Union said in a press interview that during the past 12 years the agricultural industry's income, allowing for the change in the value of money, had fallen by 5 per cent. while that of the population as a whole had risen by 30 per cent.

As readers will have seen already in the newspapers, the farmers' unions do not agree with the reductions in the guarantees, and thus, for the third time in the past 6 years, the settlement is one imposed by the Government rather than being mutually acceptable.

ROYAL SOCIETY OF HEALTH CONGRESS

The Veterinary Hygiene Section of this Congress is being held on Friday, April 29th, from 2.30 to 5.30 p.m., in the Marine Spa Ballroom, Torquay. The programme is as follows:—

Address by the President, Sir Weldon Dalrymple-Champneys, BT., C.B. "Meat Factories of the Future: a Look Ahead," by Sir Frank Shires, Chairman, Board of Governors, National College of Food Technology. "Pathological Abnormalities Encountered in Meat Inspection: a Photographic Record," by H. Thornton, Chief Veterinary Officer, Newcastle upon Tyne.

The whole Congress takes place in Torquay from April 25th to 29th.

THE EAST YORKSHIRE CLINICAL CLUB

Twenty-nine veterinary surgeons from the East and North Ridings of Yorkshire met at the Talbot Hotel, Malton, on March 7th, to discuss the formation of one or more clinical clubs in Yorkshire.

Mr. T. Johnston of Northallerton took the chair and in his opening remarks welcomed the President and Secretary of the Yorkshire Veterinary Society and then outlined the kind of club that was envisaged.

After an interesting discussion it was decided that informality was the keynote of success in this type of meeting and that, for the present, meetings should be held at the Talbot Hotel, Malton, on the first Monday evening in each month. Any veterinary surgeon or practitioner would be welcome whether a member of the Yorkshire Veterinary Society or not. Officers elected were: Mr. T. Johnston, chairman; Mr. M. A. Horrox, secretary; and A. M. McFerran, treasurer.

HOLIDAY EXCHANGES

There are a number of opportunities for the sons and daughters of veterinary surgeons in this country to visit their colleagues on the Continent during the forthcoming holiday periods, and we should be glad to hear from members of the profession who are interested in this scheme.

France—Exchange Holidays

M. Brana (aged 16½) of Gers would like to entertain a colleague in his own country town for about 3 weeks and to arrange an exchange with him during the period July 15th to September 15th to visit England.

M. Chaigneau (aged 15) of Montaigu (Vendée) would like to come to England during July and entertain his host to a sea-side holiday in France in August this year.

Mlle Denise of Blanzac (Charente) would also like to visit England on an exchange scheme.

Mlle Duplais (aged 17) of Creuse is anxious to arrange an exchange holiday with a girl of her own age.

M. Bernard Frey (aged 15) of Reims (Marne) would like to arrange an exchange holiday of 3 weeks to a month's duration during the summer.

M. Jean Lavorel (aged 17) of Annecy (Hte. Savoie) is anxious to stay in the London area. He would like to come to England from August 1st to 21st, inclusive, and to entertain his friend in rural surroundings from August 21st to September 12th.

M. Marchand (aged 16½) of Seine Maritime and M. Jack Richard (aged 14½) of Rhône are also interested in exchange holidays.

M. James Polomski (aged 13) of Tours (Indre & Loire) hopes to come to England for the Easter holidays on the exchange system.

Mlle Taillandier (aged 16) of Bugeat (Corrèze) and Mlle Thiebaut (aged 15) of Pithiviers (Loiret) are also interested in exchange holidays.

Germany

Fraulein Heidrun Albrecht would like to stay *au pair* with an English family, preferably in London or one of the University towns. She is 22 years of age and has a good knowledge of the English language.

Sweden

Dr. Isaksson of the State Veterinary Institute, Stockholm, 50, would like to arrange an exchange holiday in England for his 18-year-old son. Alternatively, he would be happy to stay as a paying guest with a veterinary family during the summer.

Paying Guests

We also have several requests from French veterinary families for accommodation for their children as paying guests with veterinary families in this country.

Pen Friends Wanted

Mlle Grosjean (aged 12) of de St. Florentin (Yonne) would like to correspond with another girl of her own age in this country.

M. Lambert (aged 13) from the Marne district and M. Bridier (aged 12) of Charente Maritime are anxious to contact young colleagues in this country as pen friends.

FOWL PEST COMMITTEE OF ENQUIRY

In an oral reply to a question by Sir Richard Nugent, M.P., in the House of Commons, the Minister of Agriculture has announced that it is the intention of the Secretary of State and himself to appoint a Committee of Enquiry with the following terms of reference:—

"To review the policy and arrangements for dealing with fowl pest in Great Britain, and to advise whether any changes should be made in the light of the growth of the poultry industry, present scientific knowledge, and technical and administrative experience gained in recent years in this and other countries."

The Minister said he would inform the House in due course of the membership of the Committee. It is expected that the enquiry will be comprehensive and somewhat similar to the enquiry which the Departmental Committee under the chairmanship of Sir Ernest Gowers made into foot-and-mouth disease in 1953 and 1954.

CAPTAIN EDWARD ERNEST JELBART, M.C.

Colonel W. L. Sinton writes:—

Edward Jelbart was the youngest and last survivor of three brothers, all members of the Royal College of Veterinary Surgeons, whose main interest was the horse.

Soon after receiving his diploma in 1914 he was commissioned in the Army Veterinary Corps and served in France throughout the 1914-18 war being awarded the Military Cross.

On demobilisation, he established a successful practice at Chipping Norton, but increasing deafness, the result of war injuries, forced him to dispose of it.

He visited India where he was appointed Veterinary Officer to the Maharajah of Jind, who had a large gun-dog kennel. During the 12 years he held this appointment he collaborated with the staff of the Imperial Institute of Veterinary Research, Mukteswar, in investigations into the prevention and treatment of piroplasmosis and enteritis in dogs.

He retired to Dallington in 1947 and because of his deafness lived very quietly. However, he maintained his interest in the profession by meeting, and corresponding with, his many friends. He died on February 29th at the age of 77.

IN PARLIAMENT

SIR A. HURD (March 14th) asked the Minister of Agriculture, Fisheries and Food if, in view of the effect in the United Kingdom of the better control of foot-and-mouth disease in countries shipping meat to Great Britain and the proposals advanced by the Argentine Government to this end, he now proposes to strengthen his Department's veterinary staff in South America.

MR. JOHN HARE: Yes, Sir. The report made by my Chief Veterinary Officer after he had visited South America as consultant to the Food and Agriculture Organisation in 1958 called attention to the advantages that would accrue from more vigorous foot-and-mouth disease control in South American countries. An additional veterinary officer of my Department is going to South America very shortly to give further assistance to the authorities there.

SIR A. HURD: While welcoming that appointment, may I ask my right hon. Friend if he will take the opportunity to impress on the Argentine Government and other Governments concerned in the Americas our very close interest in seeing that they really do get ahead now with clearing their countries from foot-and-mouth disease, stage by stage, starting preferably with vaccination?

MR. HARE: I am glad my hon. Friend has asked that question. I will certainly do that.

PERSONAL

Professor C. Formston left for Cairo on March 14th to act as Visiting Professor to the Faculty of Veterinary Medicine in the University for a period of one month.

Births

HOLMES.—On February 20th, 1960, to Marilyn, wife of Robert Geoffrey Holmes, M.R.C.V.S., D.V.S.M., a daughter, Julie Melinda, sister for Carole.

MACLELLAN.—On March 9th, 1960, to Mayrine, wife of M. MacLellan, M.R.C.V.S., "St. Kilda," Laurencekirk, a daughter.

WATKINS.—On March 7th, 1960, to Diana, wife of David Brian Watkins, B.V.M.S., M.R.C.V.S., of 217, Upper Ledbury Road, Hereford, a daughter, Sara Jayne.

Erratum

Our attention has been drawn to a printer's error on page 1,052, column 1, of the official Proceedings of Congress (*Vet. Rec.* **71**. 1,052). The expression "removal of a nose in a dog" should, of course, have read *node*.

COMING EVENTS

March

20th (Sun.). Meeting of the V.V.B.F. Ladies' Guild at the B.S.A.V.A. Conference in the Westminster Hotel, 10 a.m.

23rd (Wed.). General Meeting of the Lancashire Veterinary Association in Preston, 2.30 p.m.

Spring Meeting of the Society of Women Veterinary Surgeons at The Priory, Thurgarton, 2.30 p.m.

Meeting of the Warwickshire Veterinary Club in the Regent Hotel, Leamington Spa, 8 p.m.

Meeting of the Lancashire Veterinary Association at Booths Café, Fishergate, Preston, 2.30 p.m.

Meeting of the B.V.A. Technical Development Committee at 7 Mansfield Street, London, W.1. 10.30 a.m.

24th (Thurs.). Meeting of the Shropshire Veterinary Club at the Oaks Hotel, Shelton, Shrewsbury, 8 p.m

29th, 30th and 31st (Tues., Wed. and Thurs). Annual Conference of the A.V.T. & R.W. in Wills Hall, Parrys Lane, Stoke Poges, Bristol.

30th (Wed.). Joint Meeting of the Lincolnshire and District Division with the Society of Practising Veterinary Surgeons at the Great Northern Hotel, High Street, Lincoln, 2 p.m.

April

1st (Fri.). Informal Dinner of the North of Ireland Veterinary Association at the Grand Central Hotel, Belfast, 7.30 p.m.

2nd (Sat.). 14th Annual Dinner of the B.R.X. Club at the Royal Veterinary College, London, N.W.1, 6 p.m.

7th (Thurs.). 12th Meeting of the British Veterinary Poultry Association at the Royal Veterinary College, Camden Town, N.W.1, 11 a.m.

9th (Sat.). Symposium of the Forensic Science Society at Guy's Hospital Medical School.

12th (Tues.). All-day Meeting of the Central Veterinary Society at the Royal Veterinary College Field Station, North Mimms, preceded by luncheon at the Brookman's Park Hotel, Hatfield, 12.30 p.m.

20th (Wed.). Meeting of the Southern Counties Veterinary Society at the Royal Hotel, Winchester, 7.30 p.m.

30th (Sat.). Meeting of the N.W. Region of the B.S.A.V.A. at the Queen's Hotel, Manchester, 7.30 p.m.

Dinner and Dance of the Central Veterinary Society at the Fellows Restaurant of the Zoological Society, Regent's Park, N.W.1, 7 p.m.

August 28th to September 3rd. 78th Annual Congress of the British Veterinary Association in Glasgow.

B.V.A. COMMITTEE AND COUNCIL MEETINGS IN EDINBURGH

Tuesday, April 19th
Late Evening. Finance Sub-Committee.
Wednesday, April 20th
10 a.m. Small Animals Committee.
12 noon. Home Appointments Committee.
2.15 p.m. Veterinary State Medicine Committee.
4 p.m. Parliamentary and Public Relations Committee.
Thursday, April 21st
10.30 a.m. Farm Livestock Committee.
2 p.m. General Purposes and Finance Committee.
Friday, April 22nd
10.15 a.m. Council Meeting.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Argyll. Largiebeg Farm, Kilkenzie, Campbeltown (Mar. 8).
Ayr. Fergushill Hall Farm, Kilwinning (Mar. 14).
Banffshire. Souter Street Dairy Farm, Macduff (Mar. 10).
Devon. Strouts Farm, Tetcott, Holsworthy (Mar. 14).
Dumfries. Meikle Kirkland, Lockfoot Road (Mar. 11).
Kirkcudbright. Girdstinwood Farm, Castle Douglas (Mar. 10); Holehouse Farm, Kirkpatrick Durham, Castle Douglas (Mar. 11).
Lanark. Stonebyres Farm, Eaglesham, Glasgow (Mar. 9).
Staffs. High House Farm, Wheaton, Aston, Stafford (Mar. 11).
Suffolk. Park Farm, Parham, Woodbridge (Mar. 14).
Wilts. Biss Farm, West Ashton, Trowbridge (Mar. 10).

Foot-and-Mouth Disease

Bucks. Middle Farm, Shipton Lee, Quainton, Aylesbury (Mar. 8).
Essex. Layer Breton Hall, Layer Breton, Colchester (Mar. 14).
Herts. Elbow Lane Farm, Hertford Heath (Mar. 14).

Fowl Pest

Berks. Quarndon, Bearwood Road, Wokingham; Short Lane Farm, Touchen End, Maidenhead (Mar. 8); Baffield Farm, Dolis Lane, Wokingham (Mar. 10).
Hants. The Bakery, Shipton Bellinger, Tidworth (Mar. 8).
Herts. 1, Homestead Villas, Galley Lane, Barnet (Mar. 11).
Kent. Hale Oak Farm, Weald, Sevenoaks (Mar. 8); Caldicott Farm, Lydd, Ashford (Mar. 9); Watersmeet Brook, Ashford (Mar. 10).
Lancs. Corless Mill, Dolphinholme, Lancaster (Mar. 11).
Leics. The Nurseries, Great Glen, Leicester (Mar. 14).
Norfolk. Barn Farm, Ormesby St. Michael, Great Yarmouth (Mar. 8); Rose Cottage, Banningham, Norwich; Dereham Road, Bawdeswell, Dereham (Mar. 9); Aldons Yard, Harleston (Mar. 10); Long Common Farm, East Ruston, Stalham (Mar. 11); Riverside Bungalow, by Wortham Ling, Roydon, Diss (Mar. 13); Mill Road, Boxley, East Dereham (Mar. 14).
Notts. Smallholding, Bassingfield Lane, Gamston, Retford (Mar. 10).
Staffs. Ash House, Cah Lane, Eccleshall (Mar. 11).
Suffolk. Laurel Farm, Ubbeston, Halesworth (Mar. 8); Whiteoaks, Brockford (Mar. 11).
Surrey. 28, Grove Side, Great Bookham, Leatherhead (Mar. 10).
Sussex. Charity Farm, Horam (Mar. 10); Hill Crest, North Trade Road, Battle; Copsale Poultry Farm, Copsale, Horsham (Mar. 11); Fox End Farm, Copsale, Horsham; Great Bellhurst Farm, Beckley, Rye (Mar. 14).
Yorks. The Forge, Tadcaster; Pear Tree Farm, Saxton, Tadcaster (Mar. 8).

Swine Fever

Caerns. Llican Isaf, Tyn y Groes, Conway (Mar. 14).
Cambs. North View, Wimblington, March (Mar. 10).
Dorset. Bedchester Piggeries, Fontmell Magna, Shaftesbury (Mar. 8).
Essex. High Birch Poultry Farm, Weeley, Clacton-on-Sea (Mar. 9); Rockalls Farm, Stambourne, Halstead (Mar. 11).
Glam. Glaebe Farm, Flemingston, Cowbridge (Mar. 10).
Hunts. Mill Farm, Alconbury (Mar. 14)
Lancs. Brierfield, Flag Lane, Penwortham, Preston (Mar. 9); Barrows Farm, Kenyon Lane, Kenyon, Warrington (Mar. 11).
Kent. Slaney Place Farm, Staplehurst, Tonbridge; Granby, Bridgewood, Blue Bell Hill, Rochester (Mar. 8); Oziers Farm, Teynham, Sittingbourne (Mar. 9); Lower Runham Farm, Lenham, Maidstone (Mar. 11).
Norfolk. The Garth, West Beckham, Holt (Mar. 9); Mill Farm, North Elmham, E. Dereham (Mar. 10); Street Farm, Forncett St. Peter, Norwich (Mar. 11).
Salop. Fearny Leas, Station Road, Prees, Whitchurch (Mar. 8).
Somerset. Rodgrove Farm, Wincanton (Mar. 8).
Staffs. Westacre Farm, Westacre, Compton, Wolverhampton (Mar. 11).
Suffolk. Kiln Farm, Woolpit, Bury St. Edmunds (Mar. 8); Church Farm, Rednham, Saxmundham (Mar. 11).
Surrey. Glen Head Farm, Thursley, Godalming (Mar. 8).
Sussex. Slindon Stables, Courthill Farm, Slindon, Arundel (Mar. 14).
Warwicks. Onley Fields, Barby, Rugby (Mar. 14).
Wilts. The Cleeve, Stapleford, Salisbury; at premises rear of Rowdeford School, Rowde, Devizes (Mar. 14).

ADVERTISER'S ANNOUNCEMENT

BURROUGHS WELLCOME & Co. announce the introduction of "Leptovax-plus" brand Combined Leptospira Canicola Vaccine and Leptospira Icterohaemorrhagiae Vaccine for active immunisation of dogs against leptospirosis caused by *L. canicola* and *L. icterohaemorrhagiae*. The vaccine is issued in packs containing one immunisation course.

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Artificial Twinning in Cattle

Sir,—In 1938, I think it was, at an international congress of animal breeding or animal production, I am not sure which, I was invited to present a paper on the desirability and possibility of raising the frequency of multiple births in cattle by artificial means. To-morrow, more than 20 years later, I am to give an extension lecture in the Medical College, Baroda, again by invitation, on the subject of the biology of multiple births. This is not my sole interest, though it may seem so, but it certainly has retained my attention. While preparing my notes for this lecture I have encountered in the Indian newspapers several brief and imperfect references to the exciting field trial now being undertaken by the Cambridge group of academic agriculturalists to induce the polytocous habit in the cow. These accounts do not state what stimulus is being used —the serum from a pregnant mare—nor do they indicate what kind of twins are to be produced, mono- or di-zygous, the latter presumably.

I am not well informed concerning the reproductive equipment of the cow or concerning the hazards of pregnancy and parturition that threaten the bovine female. In my ignorance I have been wondering whether or not the observations concerning multiple births in the human female apply in any degree to twinning in cattle.

There is no difficulty in showing that the human female is equipped for the accommodation and nurturing of a singleton. In her, polytocia is "unnatural" in that it is out of harmony with her reproductive equipment. She extrudes, as a general rule, but a single ovum from her ovaries at the time of ovulation; she has a non-cornuate uterus; she has but a single pair of mammary glands. The human infant's period of development, during which it is completely dependent upon the maternal organism, is very protracted, human offspring, being so few, are very precious, and upon them very considerable parental care is lavished. The duration of the period of dependence of offspring upon adults of their own species post-natally is very prolonged. With a singleton this care can be focused upon the minimum number of recipients.

It seems probable that, having regard to the conditions and circumstances within the environment into which the calf was born in the wild, the monotocous habit would confer advantage upon the species. If this were the case then it could be expected that through selection the reproductive apparatus and habits of the cow would come to be attuned to the monotocous pattern of reproduction.

It is established that the dizygous form of twinning in the human subject has a genetic basis and that its frequency is affected by the state of reproductive efficiency of the female, as with increasing maternal age and with parity. It is established too that this form of twinning varies in its frequency in different populations. In general it seems that the higher the "level of living" and the more highly developed the social and medical services the higher is the frequency.

It is possible that the gene or gene complex that lies at the root of polyovular ovulation has become associated with other genes that modify its action so that the polyovular habit has become replaced by the monovular. It would seem that hormonic or nutritional stimuli can release the ovarian follicle from the genetic control.

That the polytocous habit is not without its undesirable aspects in the human female is shown by the following observations which are sufficiently well known as to have become part of obstetrical orthodoxy.

1. Intra-uterine death operates extensively among multiple conceptions. A very considerable proportion of twin conceptions end up as singletons. Triplets become transformed into twins or into singletons.
2. Stillbirth is almost twice as common among multiples as among singletons.
3. Prematurity is far more common among twins than among singletons and is invariable among triplets, quadruplets, and the rest.
4. Difficult labour is far more frequently encountered in the mothers of multiples than in those of singletons. Birth injuries are common, due to mutual interference. Head injuries lead to the acquired form of mental defect, which is more common in multiples than in singletons.
5. The frequency of neo-natal death is twice as high in multiples as in singletons.
6. Multiples are smaller than singletons. In the later stages of intra-uterine growth the weight increment is the same in singletons and multiples. multiples share it. Birth-weight is a factor of some importance in determining the chances of continued existence.

In the case of the human female the question as to whether or not the compensations of twinning and the like outweigh the disadvantages is one that cannot be answered at all easily for the emotions are intimately entangled with the phenomenon. But in cattle where the interest in multiple births is purely economic, cows and calves being things like any other commodity, it should be possible to construct a biological as well as a financial balance sheet in a follow-up of this trial. In the agricultural sphere it is held to be meritorious to cause 2 to grow where only one grew before, but in this particular context it is not enough to persuade the ovary to extrude more than one ovum, a very simple matter; it becomes necessary also to attune the maternal organism to a habit that for long has been anachronistic.

Yours faithfully,

F. A. E. CREW.

The Grand Hotel,
Bombay, India.

February 5th, 1960.

Tetanus in the Dog

Sir,—The report by Wickens and Boswood in THE VETERINARY RECORD of February 27th prompts us to send the details of a further case of tetanus in a dog which we encountered recently.

The subject, a 7-year-old Golden Labrador bitch kept on a farm, was first seen by one of us (M.P.) on account of sepsis of the nail of the outer middle toe of the left forefoot and there was considerable swelling of the digit. The dog was admitted to hospital and the terminal phalanx was removed. 600,000 units of procaine penicillin were given for 3 successive days, after which the patient was returned home with the foot still bandaged; lameness had become less marked but the swelling persisted.

The owner reported 8 days later that the animal appeared strange and he thought she was going to have a fit. On examination (J.W.H.H.), longitudinal folds were very evident down the forehead, the ears were more erect than normal, the eyeballs were retracted, the tail was stiff, and the dog moved with an awkward, slightly stiff gait. There was no trismus. The induration of the digit was still very marked. 5,000 units of tetanus antitoxin were given subcutaneously together with 600,000 units of procaine penicillin and 100 mg. chlorpromazine hydrochloride* was given intramuscularly before re-admitting the patient to hospital.

The next morning there was no improvement and a further dose of chlorpromazine hydrochloride was given, together with procaine penicillin. By evening the bitch was in real distress with generalised stiffness and retraction of eyeballs.

She was anaesthetised with pentobarbitone† intravenously and the affected toe was amputated at the metacarpo-phalangeal joint, together with the pad. There was no apparent damage to bones or joints but the swelling consisted of chronic inflammatory tissue. The width of the wound did not permit suturing. 5,000 units of tetanus antitoxin were given intravenously, the wound was treated with a local application of penicillin, and 600,000 units of procaine penicillin were given daily for 4 days.

The stiffness relaxed slowly at first and then more rapidly, the patient being discharged 12 days later with a small healing wound; slight folds on the forehead were still noticeable.

Yours faithfully,
J. W. H. HOLMES,

81a, Wantage Road,
Wallingford,
Berks.

M. PHILPOTT.

March 9th, 1960.

* Largactil (M. & B.).
† Sagatal (M. & B.).

Metabolic Disorders of Sheep

Sir,—In my limited experience of sheep practice, I should like to record that this is the first season when I have seen no cases of pregnancy toxaemia; on the other hand, I have seen an unusually large number of cases of hypocalcaemia. These have occurred both before and after lambing with a variety of symptoms and all have been diagnosed clinically on their response to intravenous calcium borogluconate, often within 20 minutes.

It is apparent from discussion with farmers that more of them are feeding in-lamb ewes with concentrates and it has occurred to me that this may well affect the pattern of disease in sheep, apart from any climatic factors this winter.

I should be interested to hear whether other practitioners are finding a similar alteration in metabolic disorders of sheep.

Yours faithfully,
D. R. LANE.

Guy Street,
Leamington Spa.
March 15th, 1960.

A Purchase Tax Warning

Sir,—As one engaged in cattle practice, I feel sure I was not alone in welcoming "Dictol" in 1959.

I had followed with keen interest the researches of those workers on the staff of Glasgow University Veterinary School whose self-imposed task it was to develop a vaccine against parasitic broncho-pneumonia. I conceived a faintly astonished admiration for the tireless enthusiasm of all concerned in the project.

It seemed only just that such labours should not be in vain, and the seal of success was surely set when a commercial house thought fit to adopt the product as a potentially useful vaccine.

In this practice, those farmers who used it in 1959 expressed satisfaction with the results, and to emphasise their praise have already used, or are about to use, "Dictol" this year.

In my opinion this is the most useful product to reach the cattle practitioner for some time, and is certainly the most useful discovery to emerge from a veterinary teaching establishment for many years.

It was with considerable regret, therefore, that I noticed from your correspondence columns that the Minister of Agriculture is unable to convince the Government that this vaccine is different from any patent remedy for the common cold.

I feel sure it is not too late for the Minister's advisers to re-examine and re-assess the value of "Dictol," though it seems as if one does not have to be over-sensitive to detect in the Minister's rather chilly statement more than an expression of caution.

Yours faithfully,
W. A. WHITEFORD.

6, Ryeland Street,
Strathaven,
Lanarkshire.

March 3rd, 1960.

Analyses of "Magnesium-rich" Mineral Mixtures

Sir,—We were most interested to read Dr. J. A. Watt's letter in your issue of February 6th, and are in full agreement with him that it is essential that mixtures intended for the control of hypomagnesa-

emic tetany should contain adequate levels of magnesium. Mr. J. N. Gadd, in his letter in your issue of February 27th, has provided evidence of the existence of satisfactory hypomagnesaemia-preventive mixtures, and we should like to offer a few suggestions that, if generally implemented, should help the farmer and his veterinary surgeon to ensure that adequate magnesium is being offered.

Although the majority of such mixtures contain magnesium (Mg) in the form of its oxide, we feel that it would be preferable to declare the elemental Mg content and not magnesium oxide as such. The use of CaO and P_2O_5 has caused considerable confusion in the past, particularly since realisation of the importance of the calcium : phosphorus ratio, and it would be as well to avoid any such difficulties in the case of Mg. Moreover, there is a remarkably wide variation in the actual Mg content of the various grades of "magnesium oxide" available to manufacturers. The Mg rarely attains the percentage that would be anticipated from the molecular formula of the pure oxide, and indeed may range from 30 to 70! It follows that a simple declaration, on the lines indicated by Dr. Watt, that the mixtures should contain sufficient Mg to supply the recommended 1 to 2 oz. magnesium oxide per head per day, might be liable to misinterpretation.

A further point is the palatability of the mixture, particularly when this is fed by free-access methods. The Mg actually consumed by the animal depends not only upon the level present but on the amount of mixture ingested. The problem of palatability is one that has concerned us since first we made mineral mixtures in 1932, and we have found in the case of mixtures rich in Mg that one has to strike a balance between palatability and percentage of Mg in order to achieve the most satisfactory results in practice. No matter how threatened they may be by the danger of hypomagnesaemia, cattle and sheep will not voluntarily consume an unpalatable mixture!

We should like to endorse Dr. Watt's remarks concerning the inclusion of copper in mineral mixtures for sheep. Our practice is not to add copper to such mixtures—except that offered for "swayback"—unless specifically requested to do so.

Yours faithfully,
R. B. DAWSON,
Director.

Walter Gregory & Co. Ltd.,
Wellington,
Somerset.
March 8th, 1960.

Calcium Lactate as a Dietary Supplement for Laying Hens

Sir,—In his letter in your issue of January 30th, Dr. W. P. Blount referred to a preliminary note on the above subject by Reid and myself, and to the fact that further trials had been planned: the results of these trials are incorporated in a paper in press in the *Journal of Agricultural Science* and relate to 3 series of experiments, each conducted over a full laying circle.

Since Dr. Blount was courteous enough to forward me in advance a copy of his letter, it would be invidious to criticise his results as such. It would, however, seem somewhat rash to have drawn conclusions from 2 trials, each lasting only 12 weeks, particularly since in one case there appears to have been a positive response to the incorporation of 1 per cent. calcium lactate pentahydrate in the ration: discontinuation at this point was unfortunate. The final evaluation of calcium lactate in commercial egg production can be determined only by use in the field, and I understand that the results of some 19 independent trials in this country and elsewhere are being submitted for publication in the near future. These trials were conducted with rations of varying types and, in answer to Dr. Blount's specific criticisms, it should be pointed out that the diet employed in our own experiment reported last year was based upon a standard layers' mash marketed by a compound feeding-stuffs manufacturer.

Much work remains to be done to elucidate the mechanism(s) involved in cases which respond to lactate feeding, but it seems clear that a response in terms of egg yield and/or economy of food consumption per egg laid has been demonstrated under a variety of conditions and that there is a case for further investigation. That the mode of action might involve the intestinal flora is suggesed by a number of findings, including an interesting response in one of the controlled field trials on the part of birds that had received a course of high-level antibiotic feeding.

There does not appear to be any evidence to date to indicate that the mechanism of action of calcium lactate is connected with the provision of calcium as such, and the economic comparison that Dr. Blount has drawn between lactate and carbonate as *sources of calcium* would appear to be without significance.

Mr. W. W. C. Gibson, in his letter in your issue of February 20th, reports a positive effect from calcium lactate that was not offset by additional food cost. The increased food consumption that he reports is surprising. We have never found evidence that calcium lactate increases appetite: indeed, the reverse is generally true, whether or not egg yield is affected.

Yours faithfully,
ALASTAIR N. WORDEN.

Nutritional Research Unit,
Huntingdon.
March 7th, 1960.

Duration of Immunity after Vaccination with Avianised Distemper Vaccine

Sir,—A matter of concern to practising veterinary surgeons, particularly in country districts, is the duration of immunity achieved by vaccination with the egg-adapted virus. Johnston, York, Robinson, Brueckner, and Burch (1959) published results showing that the average antibody level had fallen after 6 months from an initial peak of 1:500 to 1:200 and that a booster dose given at this time raised the antibody level to between 1:700 and 1:800. We have been able to confirm these findings. In a group of dogs kept in strict isolation we obtained the results shown below.

Average Titre Neutralising Antibody—Weeks after Vaccination

Week	*Titre*
4	120
8	320
12	640
16	640
20	320
24	160

A booster vaccination at the twenty-fourth week raised the average titre to 1:960. It would appear that, in the absence of contact infection, immunity wanes, though at a relatively slow rate. If it is accepted that a titre of 1:20 represents the critical level, it would appear that such a level is unlikely to be reached until some time after the first year.

Our observations are continuing, but it will obviously be some time before they are concluded. As a practical interim suggestion, however, we recommend those concerned about this aspect of distemper immunisation to consider revaccination. Our initial results indicate that the maximum effect is likely to be achieved some 12 to 18 months after primary vaccination.

Yours faithfully,
D. G. HOWELL,
R. E. ABLETT,
S. A. KEEBLE,
O. UVAROV.

Glaxo Laboratories Ltd.,
Greenford,
Middlesex.
March 14th, 1960.

Reference

JOHNSTON, R. V., YORK, C. J., ROBINSON, V. B., BRUECKNER, A. H., & BURCH, G. R. (1959). *Vet. Med.* **40**. 405.

"Progress"

Sir,—An important item emerges from that most important letter by H. C. Swann: the fact that dogs get distemper after having been immunised; and I am pretty sure that the advertised age of 9 weeks is much too young for the vaccine to be given. I had an experience about 2 years ago of pups being brought to me with distemper, having been inoculated at about 9 weeks old.

I make a point of advising clients that the prophylaxis has been used successfully for about 30 years but never given under 4 months of age.

I most heartily agree with Mr. Swann about "hard pad," and tell people that distemper has over one thousand symptoms and I do not know what the word means!

Yours faithfully,
L. PITCHER.

66, Coningsby Road,
High Wycombe,
Bucks.
March 11th, 1960.

A Note on Professors

Sir,—You are right to question Mr. Halpin's collective term for professors. "Gallimaufry," though a delicious word, is neither reverent nor accurate and I doubt whether your own choice is quite the *mot juste*. A "pride" of vice-chancellors, yes, and even a "laconic" of lecturers; but since professors are best observed when feeding in coveys, I would prefer a "murmur" as the appropriate collective.

Yours faithfully,
J. C. BUXTON.

P.S. Did you mean a "skulk" of golf *clubs*?*

38, High Street,
Castle Donington,
Derby.
March 14th, 1960.

* [No. In correcting one error our printer had the misfortune to make another. The clubs should have been cubs!—*Editor.*]

Warfarin Poisoning at Derby Stadium

Sir,—I find it difficult to take Mr. Bateman's letter (*Vet. Rec.* **72.** 192) seriously. Since he appears to have intended it so to be taken, some comment from me seems to be called for as there are several misconceptions or misstatements of fact in his letter. To reply to all of them would take far too much of your space.

Firstly, however, let it be noted that Mr. Bateman was at Derby Stadium for a little over 2 hours in all. His first remark on seeing a bunch of our Greyhounds was how well they looked. Yet Mr. Bateman writes about "comparable outbreaks" of scurvy in man. Anything less like scurvy I can't imagine.

I myself suggested that "trials" should be staged and that we should use dogs which we knew had cramped previously or were otherwise poor performers. One of them, "Pointed Palm," fell and died quickly. Mr. Bateman himself pointed out vegetations on the heart valves. The blood which had escaped into the abdomen (from the renal arteries only) clotted normally—in marked contra-distinction to all previous cases in which blood had remained fluid, sometimes for days.

I do not understand Mr. Bateman's reference to "one of the local veterinary surgeons" who said that he could not get authority to change the diet. In fact no authority was ever asked for, as far as I know. Why should it have been? We had had no trouble worthy of the name for 10 years or more, and the feeding had remained unchanged for all that time. Surely Mr. Bateman would have expected a vitamin-deficient condition to have become evident several times over as a result of the dreadful diet which was being fed? I understand that dogs, as well as other domestic animals, are capable of synthesising vitamin C particularly where vitamin A is in sufficient supply.

Mr. Bateman writes "sometimes 3 pints of milk (for 80 dogs) was given, but this was kept as a rule, I was told, for the 'Open Race' dogs and was not regular." In the first place Derby Stadium kennels seldom housed 2 and usually only 1 dog of Open Race calibre. And, in fact, each trainer was using 8 pints a day—16 pints in all.*

* [In a correction published subsequently, Mr. Bateman altered 3 pints to 8 pints (*Vet. Rec* **72.** 214). Mr. Wilkinson would not have had a chance to see this correction at the time of writing.—*Editor.*]

Since Mr. Bateman's letter I have made a comparison of race-times put up by our Greyhounds, in the various grades, and find that they are neither better nor worse than they were prior to the onset of our remarkable episode of sudden deaths. I should state that we have loyally continued feeding as Mr. Bateman wished.

Yours faithfully,
EDWARD WILKINSON.

216, Osmaston Road,
Derby.
March 14th, 1960.

Sir,—We have read Mr. Bateman's letter in your issue of March 5th, 1960, with some surprise, particularly his opinion that the deaths were basically due to dietetic (vitamin) deficiencies. Although Mr. Bateman mentioned avitaminosis he did not specify any particular vitamin/s as being incriminated, but as he drew attention to scurvy in man, might we be so bold as to assume that he was considering vitamin C, plus perhaps vitamin K and K_1?

In a Japanese prisoner-of-war camp, one of us had the misfortune to suffer from both the paralytic and dropsical forms of beriberi combined with pellagra, ulcerated gums, and retro-bulbar neutritis—broadly speaking, the "vitamin B complex." Many thousand fellow prisoners suffered in the same way. In the main we were able to resist *vitamin C* deficiency by drinking a nauseating extract made from green grass. To some extent this may have helped the "B" deficiency, too, but when a man of some 12 to 13 stone is reduced by such a diet to under 7 stone, he may perhaps be excused from doubting that both he and his fellows "looked well," and certainly not comparable with a racing Greyhound.

In any case we consider that analogy between man and dog with regard to avitaminosis is basically unsound.

We should be most interested to receive information concerning the experimental production of vitamin C and K deficiency *in the dog* with particular references to (a) diet, conditions, and time required to produce the deficiencies; (b) symptoms; (c) *post-mortem* lesions. If this information is forthcoming would the author please state if the dogs would be passed fit to race by a veterinary surgeon?

Regarding the toxic dosage of Warfarin, we never have, and never will, know the quantity consumed by affected Greyhounds at Derby. Mr. Bateman, quoting a personal communication from Dr. Bentley, stated that 5 to 10 mg. per kg. would be likely to kill if administered over 3 to 4 days. We have not used that dosage. In our experiments here we found that 0.17 mg. per kg. of pure Warfarin (as obtained from the Ministry of Agriculture) fed once daily to a healthy dog (on an impeccable diet) produced a marked change in the Quick one-stage time (so-called "prothrombin time") from a premedication normal of 7 seconds to 22 seconds on the third day, 35 seconds on the ninth day, and nearly 1 minute on the thirteenth day. Another dog receiving Dicoumarol at 3.39 mg. per kg. daily gave an even more severe reaction.

Both dogs had symptoms of Warfarin poisoning, and part of the experiments included treatment with vitamin K_1 which was successful.

In another experiment the dosage was doubled and the dogs died. The *post-mortem* lesions were identical with those which we described in the Derby Greyhounds. This work has been submitted for publication.

On March 16th, 1959, a Greyhound was received for *post-mortem* examination from Great Yarmouth Stadium through the courtesy of Mr. W. Shipley, B.SC., M.R.C.V.S. Analysis was made for alkaloids, metallic poisons, cyanides, and barbiturates with negative results but it was *positive for Warfarin*. The report stated "the analysis is consistent with the animal having succumbed to Warfarin poisoning" (Milton, 1959). Again the *post-mortem* lesions were identical with our findings in the Derby cases and in our own experiments.

Furthermore, a working Labrador gun-dog was brought to us *in extremis* with retinal haemorrhages and bleeding from mouth and anus. The Quick one-stage time (carried out by Dr. Archer of the Equine Research Station) was 3 times the normal. The animal died. We apologise for consistent repetition but once again the *post-mortem* lesions were of Warfarin poisoning and the gamekeeper admitted that he used Warfarin on the farm. We could quote many other such cases. We submit that diagnosis of Warfarin poisoning in domestic animals is not exactly applauded by Pest Control Officers as Warfarin does seem to be a good rodenticide, but it *can* kill dogs (plus other mammals and poultry).

With regard to canine virus hepatitis, Mr. Bateman is entitled to his opinion that this is not a kennel sickness of Greyhounds. It did not kill any of the Greyhounds at Derby. May we prevail on those readers who might be interested to study our *post-mortem* lesions and the "Discussion" in our published paper.

In conclusion we submit—with due deference to Mr. Bateman's wide experience of the Greyhound—that neither "disease" nor "deficiency" could have caused such acute deaths with such marked haemorrhagic lesions in animals clinically normal immediately prior to most of the events described.

After all, they were passed fit by a veterinary surgeon!

May the cessation of deaths not have been due to the destruction of all contaminated foods, and also to the fact (so we are informed) that many of the seriously affected dogs which had not died, were otherwise disposed of?

Yours faithfully,
S. F. J. HODGMAN.
R. S. T. BOWDEN.

The Animal Health Trust,
Canine Health Centre,
Kennett,
Nr. Newmarket,
Suffolk.
March 14th, 1960.

References

BOWDEN, R. S. T., BAXTER, M. K., HODGMAN, S. F. J., & WILKINSON, E. (1959). *Vet. Rec.* **72**. 102.
MILTON, R. F. (1959). Personal communication.